EVADE Program Improves Outcomes in DKA in the ED

Written by Nicola Parry

Maria Koen, NP, and Marianne Chojnicki, MHA, RN, both of the Joslin Diabetes Center, Boston, Massachusetts, USA, presented results from a pilot study of the Emergency Variable Approach and Diabetes Education [EVADE] protocol, demonstrating its effectiveness for increasing discharge rates from the emergency department (ED) and reducing admissions to the intensive care unit (ICU) associated with diabetic ketoacidosis (DKA).

Although a preventable complication, 4.6 to 8 episodes of DKA arise per 1000 patients with type 1 diabetes mellitus [Kitabchi AE et al. *Diabetes Care* 2001] with an associated mortality rate as high as 5% in the elderly and in patients with concomitant life-threatening illnesses and up to 2% in developing countries [Kitabchi AE et al. *Diabetes Care* 2009]. DKA is also responsible for >500,000 hospital days per year, with an estimated annual direct medical expense and indirect cost of $2.4 billion that imposes a significant economic burden on the health care system.

According to the presenters, the majority of patients with DKA who present to the ED at their teaching hospital are hospitalized, and most are admitted to the ICU. However, there are no known protocols for the treatment of mild episodes of DKA in the ED to avoid hospitalization and no studies describing outcomes measures for patients with DKA who are discharged from the ED.

With this in mind, the presenters developed the EVADE protocol, a program that trains health care professionals in the ED to manage mild cases of DKA and discharge patients within 24 hours of receiving customized diabetes education to prevent DKA recurrence. One aim of the program was to reduce hospitalizations by 10% in an effort to reduce medical cost.

To assess the effectiveness of the EVADE protocol, patients who presented to the ED with blood glucose (BG) levels >300 mg/dL and bicarbonate levels ≤20 mEq/L were initially identified and then enrolled in the program if their condition was caused by DKA and they consented to be involved.

For all patients, the protocol involves initial intravenous (IV) fluid administration. IV insulin therapy is instituted only if laboratory results confirm DKA, with the aim of achieving a bicarbonate level of 21 mEq/L. Patients receive a starting rate of insulin based on a BG reading from an initial finger stick, with no initial insulin bolus.

If a patient requires admission to the ICU, he or she receives frequent monitoring of BG, electrolytes, venous blood gas, and urine output. Other components of the protocol include hourly finger sticks to facilitate insulin dose adjustment to achieve a target BG level of 100 to 180 mg/dL and electrolyte repletion as necessary.

Outcomes data showed that of 106 patients managed according to the protocol, 24 (23%) were discharged from the ED after a mean duration of 20 hours. Of the remaining patients who were hospitalized, the mean length of stay for those (n=23) with non-ICU admissions was 136 hours, whereas those with ICU admissions (n=59) had a mean length of stay in the ICU of 33 hours, followed by 77 hours in the hospital after discharge from the ICU.

These results indicate that mild DKA can be optimally managed in the ED by identifying the triggering factor, stabilizing BG and electrolyte imbalances, educating patients, and conducting a close follow-up examination. The presenters concluded that this could allow more patients to be discharged from the ED.

Difficult Hospital-to-Home Transitions Worsen Outcomes in Elders With Diabetes

Written by Nicola Parry

Jacqueline LaManna, PhD, APRN, University of Central Florida College of Nursing, Orlando, Florida, USA, presented results from a study demonstrating that the hospital-to-home transition in older adults with diabetes mellitus (DM) is affected by a variety of personal, hospital, and community factors. Recidivism within 30 days of discharge was associated with increased coping difficulty in elders, and common complications included medication management, trouble controlling glucose, and regulating another chronic illness.

More than 5 million older adults with DM are hospitalized each year [Centers for Disease Control and Prevention. *National Diabetes Fact Sheet*, 2011]. Although diabetes is not always the cause of the hospitalization, diabetes control often deteriorates during the hospital stay and requires changes in home self-care plans. The specific transitional care needs of this patient population are poorly understood.

With this in mind, Dr. LaManna conducted a simultaneous quantitative and qualitative mixed-methods design study in older adults with diabetes to determine factors that affected the home recovery transition and to identify common difficulties encountered by patients and their families during the early and intermediate postdischarge transition periods.

The study sample comprised 96 older adults (median age, 75 years; 80% white) with a preexisting diagnosis of DM (median duration, 11 years; range, 1 to 49 years).

Table 1. Major Difficulties Identified Following Discharge From Hospital

	7-Day Follow-Up, n = 67		30-Day Follow-Up, n = 55	
Theme	**%**	**n**	**%**	**n**
Daily life is difficult.	**56.7**	**38**	**56.3**	**31**
▪ Personal care and household tasks	44.3	29	41.8	23
▪ Walking and mobility	17.9	12	18.2	10
▪ Transportation	4.5	3	12.7	7
▪ Getting supplies and medicines	4.5	3	0	0
Engineering care at home is complex.	**52.2**	**35**	**43.6**	**24**
▪ "I come last"	20.9	14	25.5	14
▪ "Doing it alone is difficult"	3	2	7.3	4
▪ Mobilizing family and support resources	14.9	10	20	11
▪ "This is rough on my family"	34.3	23	18.2	10
Life is stressful.	**22.4**	**15**	**29.1**	**16**
▪ "Too many outside influences"	6	4	9.1	5
▪ Grief and depression	3	2	12.7	7
▪ Anxiety and frustration	16.4	11	12.7	7
Managing multiple complex health problems is difficult.	**52.2**	**35**	**78.2**	**43**
▪ "My diabetes has been hard to control"	17.9	12	29.1	16
▪ Managing other chronic health problems	31.3	21	47.3	26
▪ "So many medicines"	16.4	11	10.9	6
▪ "I need more information"	13.4	9	1.8	1

On discharge from the hospital, 35.6% of patients required insulin therapy and 40% experienced a change in their diabetes treatment plan. More than 75% of patients had a preexisting diagnosis of a chronic diabetes-related health condition. The most frequently reported chronic health conditions were coronary artery disease (61.5%), diabetic neuropathy (57.3%), chronic kidney disease (45.8%), and heart failure (38.5%). Following discharge, 41.1% of patients (n = 30) experienced event recidivism and 21.9% (n = 16) were rehospitalized within 30 days.

A qualitative analysis of information gathered during administration of the Post Discharge Coping Difficulty Scale (PDCDS) identified difficulties encountered by the older patients and their family caregivers during the first 30 days following discharge. These comprised 4 major themes (Table 1).

Quantitative analyses showed that patients who experienced an event of recidivism had lower predischarge assessments of readiness on the Readiness for Hospital Discharge Scale ($p = .028$), and higher PDCDS scores were found in patients who reported unmet discharge information needs ($p = .023$), experienced recidivism within 30 days of discharge ($p = .003$), and reported difficulties managing medication regimens ($p = .031$), controlling their diabetes ($p = .036$), or managing another chronic disease ($p < .001$).

Early and intermediate recidivism, however, were not related to age, gender, chronic disease pattern, diabetes-related health status variables, use of hospitalist services, length of hospital stay, quality of discharge teaching, availability of an in-home family caregiver, or use of home health services.

Dr. LaManna concluded that improved understanding of the sequential nature of the transition and the dynamic needs of older adults and their families during this time is essential, and diabetes educators have the potential to positively affect this transition.